

### **REMARKS**

Claims 1, 3-10, 14, 16-32, 34-37, and 40-46 remain in this application with claim 1 and 32 in independent form. Claims 1, 32, 45, and 46 have been amended and claims 2, 11-13, 15, 33, and 38-39 have been cancelled.

Applicant submits herewith a petition for a two-month extension of time to extend the period of reply to June 10, 2006. As such, the subject reply is believed to be timely.

The Examiner objected to the specification filed October 31, 2005 under 35 U.S.C. §132(a) because the Examiner contends that the amendment introduced new matter into the disclosure. Applicant has amended paragraph [0029] as suggested by the Examiner. Thus, the objection has been overcome.

Claims 45 and 46 stand rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement. Specifically, the Examiner contends that claims 45 and 46 introduce new matter as result of claiming that the chain extender has a hydroxyl number of from about 448 to about 4488 mg KOH/g. Claims 45 and 46 have been amended and the §112 rejection is believed to be overcome.

### **Claim Rejections – 35 U.S.C. § 103**

Claims 1, 3-10, 14, 16-32, 34-37, and 40-46 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Bleys (United States Patent No. 5,968,993) and as being unpatentable over Lutter et al. (United States Patent No. 5,420,170).

The Examiner has not established the requisite *prima facie* case of obviousness in relation to claims 1, 3-10, 14, 16-32, 34-37, and 40-46. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to

one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See Manual of Patent Examining Procedure (MPEP) § 2143.

Applicant submits herewith, as Exhibit A, a Declaration under 37 C.F.R. §1.132 from one highly skilled in the art of polyurethane formulation. The Declaration sets forth the results of various viscoelastic polyurethane foams formed according to the subject invention that are attributable to the composition as claimed. Further, the Declaration sets forth sample foams prepared in accordance with the references relied upon by the Examiner and addresses the impropriety and inoperability of modifying such references, which modifications do not arrive at the subject invention as claimed. It is well settled that all of the competent rebuttal evidence taken as a whole should be weighed against the evidence supporting the *prima facie* case. *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

Applicant addresses each of the independent claims, claims 1 and 32 separately below.

**Bleys (United States Patent No. 5,968,993)**

Referring to the §103 rejection based upon Bleys, the Examiner states that Bleys discloses preparations of polyurethane foams prepared from isocyanates, polyols, and chain extenders that have densities as claimed. Specifically, the Examiner cited Example 3 of Bleys that produces a microcellular elastomeric polyurethane foam having a density of 420 kg/m<sup>3</sup>, or 26.2 pounds per cubic foot. Further, the Examiner contends that Bleys

discloses preferred densities of less than  $600 \text{ kg/m}^3$ . The Examiner then contends it would have been obvious for one having ordinary skill in the art to vary the amounts of the blowing agents to arrive at Applicant's claims.

**Lutter et al. (United States Patent No. 5,420,170)**

Referring to the §103 rejection based upon Lutter et al., the Examiner states that Lutter et al. discloses preparations of polyurethane foams prepared from isocyanates, polyols, and chain extenders having densities claimed. The Examiner also states that Lutter et al. recites variation of amounts of chain extenders that overlap with the claimed ranges. The Examiner contends that since the amount of chain extender may be varied for the purposes of controlling polymer build-up, it would have been obvious to vary the amount of chain extender to arrive at the claimed invention for the purpose of controlling polymer build-up.

Claim 1

Claim 1 has been amended to claim a viscoelastic polyurethane foam having *a density of greater than two and a half pounds per cubic foot* and the foam *substantially free of flame retardant*. The foam comprises a reaction product of an isocyanate component *substantially free of toluene diisocyanate* and an isocyanate-reactive blend. The blend comprises a first isocyanate-reactive component and a second isocyanate-reactive component. The first isocyanate-reactive component has at least two isocyanate-reactive groups, a weight-average molecular weight of from 2500 to 4500, a hydroxyl number of from 30 to 50, and comprises at least 60 parts by weight of ethylene oxide

based on 100 parts by weight of the first isocyanate-reactive component. The second isocyanate-reactive component has at least three isocyanate-reactive groups, a weight-average molecular weight of from 1000 to 6000, a hydroxyl number of from 20 to 500, and comprises at most 30 parts by weight of ethylene oxide based on 100 parts by weight of the second isocyanate-reactive component.

The first isocyanate-reactive component is used in an amount of from 40 to 75 parts by weight and the second isocyanate-reactive component is used in an amount of from 25 to 60 parts by weight, both-based on 100 parts by weight of the isocyanate-reactive blend. The foam also includes a chain extender having a weight-average molecular weight of from 25 to 250 and having a backbone chain with from two to eight carbon atoms and having two isocyanate-reactive groups, wherein the chain extender is used *in an amount of from 7 to 30* parts by weight based on 100 parts by weight of the foam. The foam has *a glass transition temperature of from 5 to 65 degrees Celsius and a tan delta peak of from 0.75 to 1.75.*

Referring to §103 rejection based on Bleys and the Declaration submitted under 37 C.F.R. §1.132, the Declaration addresses the impropriety of modifying Bleys when viewed as a whole and without using impermissible hindsight and the inoperability when modified as the Examiner suggests. Specifically, Bleys is directed toward microcellular elastomeric polyurethane foams, which does not exhibit viscoelastic properties. Bleys requires the microcellular elastomeric polyurethane foam to have a Shore A hardness of at least 85 (see col. 3, lines 23-29). Shore hardness is a measure of the resistance of material to indentation by a 3 spring-loaded indenter. The higher the number, the greater the resistance. Typically, Shore A hardness ranges from about 20 to about 95.

Illustrative materials that fall within this range include printing rolls, door seals, solid truck tires, abrasive-handling pads, and non-spark hammers. As made clear by the Declaration, viscoelastic polyurethane foams are flexible and, as such; do not have a Shore A hardness falling within this range, if at all. Since Bleys is directed toward microcellular elastomeric polyurethane foams having a Shore A hardness of at least 85, one of ordinary skill in the art would not look to Bleys when manufacturing viscoelastic polyurethane foams. Moreover, Bleys teaches away from forming viscoelastic polyurethane foams by requiring such a Shore A hardness.

Bleys only discloses a polyol blend having an average oxyethylene content of between 50 and 85 weight percent. The examples of Bleys disclose elastomers formed individually from a Polyol A, a Polyol B, and a Polyol C, i.e., no blends of Polyols A, B, or C. Polyol A is a polyether triol having random oxyethylene (EO) and oxypropylene (PO) residues with a 76% oxyethylene content and OH-value of 42 mg KOH/g. Polyol B is EO/PO triol having 10% EO-tip and OH-value of 36 mg KOH/g. Polyol C is a EO/PO diol having 75% random EO-groups and MW=4000.

Accordingly, Bleys does not disclose, teach, or suggest, the unique and novel isocyanate-reactive blend as claimed in combination with the claimed amounts of chain extender and there is no teaching or suggestion to modify Bleys as the Examiner suggests. Bleys also does not disclose, teach, or suggest, the microcellular elastomeric polyurethane foams having a glass transition temperature of from 5 to 65 degrees Celsius and a tan delta peak of from 0.75 to 1.75 and there is no teaching or suggestion to modify Bleys as the Examiner suggests.

Therefore, the §103 rejection is overcome and claim 1 is believed to be allowable.

Claims 3-10, 14, and 16-31, which depend directly or indirectly from claim 1, are also believed to be allowable.

Referring to the §103 rejection based on Lutter et al. and again to the Declaration under 37 C.F.R. §1.132, the Declaration addresses the impropriety of modifying Lutter et al and the inoperability of modifying Lutter et al. as the Examiner suggests. Lutter et al. is silent as to the glass transition temperature of the viscoelastic polyurethane foam formed therein. As such, the Declaration compared foams prepared based upon the teachings of Lutter et al. with those of the subject invention.

Specifically, the foams were prepared in accordance with Example 6 having the chain extender present in an amount of 6 parts by weight. The resultant foam had a glass transition temperature of 52 °C. Foams having such a high glass transition temperature become rigid and no longer have viscoelastic properties, as set forth in the attached Declaration. Those of ordinary skill in the art would anticipate that increasing the amount of the chain extender, as taught by Lutter et al., would *further increase* the glass transition temperature resulting in the foam becoming more rigid. Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut *prima facie* obviousness. “Evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness.” No set number of examples of superiority is required. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987). Further, there is no disclosure, teaching, or suggestion of adjusting the amount of the chain extender to have the glass transition temperature coincide with the use temperature of the foam).

In comparison with the second set of examples set forth in the Declaration, even when the subject invention has a higher amount of chain extender than the examples of Lutter et al., the viscoelastic polyurethane has a glass transition temperature lower than 52 °C. More specifically, Examples 13-19 are prepared in accordance with the claimed invention. Examples 16-18 have the chain extender present in the claimed amounts and exhibit glass transition temperature from 5 °C to 44 °C and a peak tan delta from 1.0 to 1.6. The foam prepared according to Lutter et al. has a higher glass transition temperature than the claimed ranges at a lower amount of chain extender. In other words, increasing the chain extender to the amounts claimed will continue to increase the glass transition temperature beyond the claimed range.

Accordingly, Lutter et al. does not disclose, teach, or suggest, each and every limitation present in claim 1 and there is no teaching or suggestion to modify Lutter et al. as the Examiner suggests. Therefore, the §103 rejection is overcome and claim 1 is believed to be allowable. Claims 3-10, 14, and 16-31, which depend directly or indirectly from claim 1, are also believed to be allowable.

Claim 32

Claim 32 has been amended to claim a composition for use in preparing a viscoelastic polyurethane foam having *a glass transition temperature of from 5 to 65 degrees Celsius and a tan delta peak of from 0.75 to 1.75 and a density of greater than two and a half pounds per cubic foot and being substantially free of flame retardant.* The composition comprises an isocyanate component *substantially free of toluene diisocyanate* and an isocyanate-reactive blend.

The isocyanate-reactive blend comprises a first isocyanate-reactive component and a second isocyanate-reactive component. The first isocyanate-reactive component has at least two isocyanate-reactive groups, a weight-average molecular weight of from 2500 to 4500, a hydroxyl number of from 30 to 50, and comprises at least 60 parts by weight of ethylene oxide based on 100 parts by weight of the first isocyanate-reactive component. The second isocyanate-reactive component has at least three isocyanate-reactive groups, a weight-average molecular weight of from 1000 to 6000, a hydroxyl number of from 20 to 500, and comprises at most 30 parts by weight of ethylene oxide based on 100 parts by weight of the flexible isocyanate-reactive component.

The first isocyanate-reactive component is present in an amount of from 40 to 75 parts by weight and the second isocyanate-reactive component is present in an amount of from 25 to 60 parts by weight, both based on 100 parts by weight of the isocyanate-reactive blend. The composition also includes a chain extender having a weight-average molecular weight of from 25 to 250 and having a backbone chain of from two to eight carbon atoms and having two isocyanate-reactive groups, wherein *the chain extender is present in an amount of from 7 parts by weight to 30 parts by weight* based on 100 parts by weight of the composition.

Referring to the §103 rejection based on Bleys, as described above, Bleys discloses a microcellular elastomeric polyurethane foam, and does not disclose, teach, or suggest, a composition for forming a viscoelastic polyurethane foam. To the contrary, Bleys specifically requires the microcellular elastomeric polyurethane foam to have Shore A hardness of at least 85. It is well known by those of ordinary skill in the art that such measurements are for rigid and semi-rigid products, whereas viscoelastic polyurethane



foams do not have a Shore A hardness of at least 85. Even though Bleys discloses that the microcellular elastomeric polyurethane foam has a preferred density of less  $600 \text{ kg/m}^3$  (or 37.5 pcf), the microcellular elastomeric polyurethane foam must also have the requisite Shore A hardness. The viscoelastic polyurethane foams made according to the subject invention do not satisfy such criteria.

Accordingly, Bleys does not disclose, teach, or suggest each and every limitation present in claim 32 and there is no teaching or suggestion to modify Bleys as the Examiner suggests. Therefore, the §103 rejection is overcome and claim 32 is believed to be allowable. Claims 34-37 and 40-46 which depend directly or indirectly from claim 32, are also believed to be allowable.

Referring to the §103 rejection based on Lutter et al., as described above, Lutter et al. does not disclose, teach, or suggest, a composition for forming a viscoelastic polyurethane foam employing chain extenders in the specific amounts claimed to arrive at a foam having a glass transition temperature as claimed. To the contrary, foams formed in accordance with Lutter et al. have significantly higher glass transition temperatures when prepared with lower amounts of chain extender. As such, increasing the amount of the chain extender would further increase the glass transition temperature. There is no suggestion or motivation within Lutter et al. to employ the chain extender in the amount claimed to arrive at a foam according to the subject invention.

Accordingly, Lutter et al. does not disclose, teach, or suggest, each and every limitation present in claim 32 and there is no teaching or suggestion to modify Lutter et al. as the Examiner suggests. Therefore, the §103 rejection is overcome and claim 32 is believed to be allowable. Claims 34-37 and 40-46 which depend directly or indirectly

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from claim 32, are also believed to be allowable.

It is respectfully submitted that the Application, as amended, is now presented in condition for allowance, which allowance is respectfully solicited. Applicant believes that no fees are due, however, if any become required, the Commissioner is hereby authorized to charge any additional fees or credit any overpayments to Deposit Account 08-2789.

Respectfully submitted

**HOWARD & HOWARD ATTORNEYS, P.C.**

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Date

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